Installation instructions

Accessories

for PA CNC control units

POWER AUTOMATION

Power Automation GmbH
CNC-Automatisierungstechnik
Gottlieb-Daimler-Str. 17/2
74385 Pleidelsheim
Germany
Telephone: +49-7144-899-0
Fax: +49-7144-899-299
email: info@powerautomation.com
Internet: www.powerautomation.com
Original installation instructions

Version 2.0

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1 General information

1.1 Information on this manual

General Information

This installation manual provides important information on how to work with the control unit safely and efficiently.

The installation manual is part of the control unit, must always be kept in the control unit's direct proximity and should be available for the personnel at any time. All personnel working with the control unit are obliged to have read and understood this installation manual before starting any work. Strict compliance with all specified safety notes and instructions is a basic requirement for safety at work.

Moreover, the accident prevention guidelines and general safety regulations applicable at the place of use of the control unit must also be complied with.

Illustrations in this installation manual are intended to facilitate basic understanding, and may differ from the actual design of the control unit.

The enclosed manuals for the installed components apply together with this installation manual.

1.2 Explanation of symbols

Warnings

Warnings are identified by pictures. These warnings are introduced by signal words, which express the severity of a danger.

Pay attention to these warnings and act cautiously in order to avoid accidents, personal injuries and damage to property.

DANGER!

… indicates an imminently hazardous situation which, if unavoidable, will result in death or serious injury.

WARNING!

… indicates a potentially hazardous situation which, if unavoidable, could result in death or serious injury.

CAUTION!

… indicates a potentially hazardous situation which, if unavoidable, may result in minor or moderate injury.

NOTICE!

… indicates a potentially hazardous situation which, if unavoidable, may result in property damage.

… emphasizes useful hints and recommendations as well as information for efficient and trouble-free operation.

Special Safety Notes

The following symbols are used in connection with the safety notes to highlight particular dangers:

DANGER!

… highlights hazards caused by electric current. There is a danger of serious injury or death if the safety notes are not complied with.

Additional symbols and highlighting

The following symbols and highlights are used to distinguish instructions, descriptions of results, cross-references and other elements inside this manual.

.. Highlights a step as part of a procedure of instructions.

⇨ .. Highlights a state or an automatic process as a result of an instruction.

■ .. Highlights single or unordered instructions and lists.

“Additional symbols and highlighting” on page 6.. Highlights cross-references to chapters or sections of this manual.

[Key].. Highlights captions of buttons, fields and other elements of the software's graphical user interface.

“Menu ➔ Submenu ➔ ”.. Highlights a path to access a menu or submenu in the software's graphical user interface.

`Example/Extract`.. Highlights verbatim examples and extracts from configuration files.

1.3 Limitation of liability

Liability

All information and notes in this installation manual were compiled under due consideration of valid standards and regulations, the present status of technology and our years of knowledge and experience.

Power Automation can not be held liable for damage resulting from:

- disregarding this installation manual
- unintended use
- employment of untrained personnel
- unauthorized conversions
- unauthorized modifications to the software
- technical modifications
- use of unapproved spare parts
- use in conjunction with machines not deemed compatible by Power Automation

In case of customized versions the actual scope of delivery can vary from the explanations and representations in this installation manual, because of the utilization of additional options or due to the latest technical changes.

Apart from this, the obligations agreed upon in the delivery contract, the general terms and conditions, and the delivery conditions of Power Automation and the legal regulations valid at the time of contract apply.

We reserve the right to make technical modifications in order to improve usability.

1.4 Copyright

Copyright

This installation manual is protected by copyright law.

Passing this installation manual on to third parties, duplication of any kind – even in form of excerpts – as well as the use and/or disclosure of the contents without the written consent of Power Automation is not permitted.

Violations oblige to compensation. The right for further claims remains reserved.

1.5 Warranty terms

Material Warranty

The material warranty terms are provided in Power Automation's terms and conditions as well as inside the sales documents.

1.6 Customer service

Service

Our Customer Service is always available for technical information.

For information on whom to contact by phone, fax, e-mail or via the internet, see Power Automation's address on page 2.

Additionally, Power Automation staff is always interested in receiving new information and experiences resulting from the use of our products, which could be of great value for future improvements.

1.7 Glossary

CMOS - Complementary metal-oxide-semiconductor

CNC - Computerized Numerical Control

DDU - Delivered Duty Unpaid

HMI - Human Machine Interface

The graphical user interface provided by the PA software.

IPC - Insulating Piercing Connector

MDI - Manual Data Input

MTBP - Machine Tool Builder's Panel

Panel including the basic requirements for a machine tool operator: emergency stop push button, cycle start and stop push buttons, jog plus and minus push buttons, feed rate and spindle speed override pots and a number of auxiliary push buttons.

NC-Start - Numerical Control Start Button

NC-Stop - Numerical Control Stop Button

PA - Power Automation

PAMIO - Power Automation Modular Input Output

Extendable Superbus based interface allowing connection of additional I/O modules.

PC - Personal Computer

PCI - Peripheral Component Interconnect

Personal computer extension for periphery devices connected to the motherboard.

PLC - Programmable Logic Controller

POU - Program Organization Unit PLC functions, function blocks and programs are POUs

RMS - Rotating Measuring Systems (Encoder)

2 Safety

2.1 Customer's responsibility

The control unit is used for commercial purposes. The operating company is thus subject to the legal obligations concerning industrial safety.

The safety, accident prevention and environmental protection regulations applicable for the area of application of the machine must be complied with, along with the safety notes specified in this installation manual. The following applies in particular:

- The customer must become familiar with the industrial safety regulations and identify additional dangers which may arise due to the specific working conditions at the place of use of the control unit, by means of a risk analysis. These must be converted into operating instructions for operation of the control unit.
- Throughout the time of use of the control unit the customer must check whether the operating instructions created by him correspond to the current status of regulations and standards. Whenever changes in regulations and standards occur, instructions must be adapted accordingly.
- The customer must clearly specify the responsibilities for installation, operation, maintenance, and cleaning.
- The customer must make sure that all employees who have to work with the control unit have read and understood these operating instructions.

  In addition, the customer must train and inform his personnel about potential dangers at regular intervals.

Moreover, the customer is also responsible for keeping the control unit in technically good condition, and therefore the following applies:

- The customer must make sure that the maintenance intervals specified in these operating instructions are complied with.
- The customer must regularly check all safety features for function and completeness.
- The customer must supply his personnel with the necessary protective equipment.

2.2 Personnel requirements

2.2.1 Qualifications

WARNING!

Danger of injury in case of insufficient qualification!

Improper operation can lead to severe personal injuries and/or material damage.

– Only those persons who have been specified in the corresponding chapters of this installation manual should be entrusted with the listed types of work.
– Employ certified experts, if in doubt.

The following qualifications are specified for different areas of activity listed in the installation manual.

Qualified personnel
are able to carry out assigned work and to recognize possible dangers due to professional training, knowledge, and experience as well as profound knowledge of applicable regulations.

2.2.2 Unauthorized persons

WARNING!

Danger for unauthorized persons!

Unauthorized persons, who do not meet the requirements described in this installation manual, are not aware of the dangers in the working area.

– Keep unauthorized persons away from the working area.
– If in doubt, address such persons and ask them to leave the working area.
– Interrupt your work as long as unauthorized persons are in the working area.

Only persons who are expected to perform their tasks reliably are permitted as personnel. Persons whose reaction capability is impaired, e.g. through drugs, alcohol or medication are not permitted.

- When selecting personnel, ensure that the personnel can work with the control unit in terms of technical and content aspects.

2.3 Intended use

Intended Use

The control unit is exclusively intended and built for the use described in this installation manual.

The control unit is to be used exclusively to control CNC machines of a supported number of axes which are in accordance with the types cleared by Power Automation. Prerequisite for the intended use of the control unit is proper configuration as described in the installation manuals provided by Power Automation.

Dangers

WARNING!

Beware of unintended use!

Any use exceeding the scope of intended use and/or different application of the control unit can result in hazardous situations.

- Operate the control unit as intended only.
- Observe all instructions in this installation manual.
- Observe the permissible ambient conditions and electromagnetic compatibility mentioned in the technical data.

Claims of any kind for damage resulting from unintended use are void.

The operator is solely responsible for all damage resulting from unintended use.

2.4 Unintended use

Unintended Use

WARNING!

Beware of unintended use!

- In particular, avoid using the control unit for the following purposes as these are regarded as not intended:
  - Operation using software not approved by Power Automation.
  - Operation connected to machines/drives not deemed compatible by Power Automation.
  - Operation using wrong number of axes
  - Wrong or missing execution of the maintenance intervals
  - Operation by not instructed personnel

2.5 Personal protective gear

Wearing of personal protective gear is required to minimize health hazards and damage when working with the control unit.

- Always wear the protective equipment that is necessary for the respective task when working.
- Follow the instructions on personal protective equipment that are listed in this installation manual and other installation manuals provided by Power Automation.
- The environment in which the control unit is installed may require users to wear additional personal protective gear.
  Observe the instructions on personal protective gear provided by the operating company.

Antistatic gloves
for protection of the hands during the work. Wear the antistatic gloves always until the work is finished.

ESD clothing
for protection of components susceptible to electrostatic discharge. Wear the ESD clothing during the work on electrostatic components.

ESD safety pad
for protection of components susceptible to electrostatic discharge. Put the ESD safety pad on the floor before starting to work.

ESD safety shoes
for protection of components susceptible to electrostatic discharge. Wear the ESD safety shoes to protect electrostatic-discharge-sensitive devices due to inadequate derivative electrostatic energy.

Ear protection
for protection of the ears during the work. Wear the ear protection always until the work is finished.

Ground strap
for protection of components susceptible to electrostatic discharge. Wear the ground strap on your wrist and connect it to a suitable equipotential bonding.

Protective glasses
for protection of the eyes during the work. Always wear the protective glasses until the work is finished.

2.6 Conduct in a dangerous situation and in case of accidents

Preventive Measures

- Stay informed about locations of first aid equipment (first aid kit, covers, etc.) and fire extinguisher at the site of installation.
- Instruct personnel about accident reporting, first aid and rescue facilities at the site of installation.

In Case Of Accidents

- Disconnect power supply immediately.
- Initiate first aid measures.
- Inform responsible persons at the site.
- Call for rescue service if applicable.

2.7 Environmental protection

CAUTION!

Environmental hazard caused by incorrect handling!

Incorrect handling of environmentally hazardous substances, especially incorrect waste disposal, can cause considerable damage to the environment.

The following environmentally hazardous components or substances are contained in the control unit:

Electronic Components

Electronic components are considered special waste. They must be properly disposed of.

Power Automation will accept the control unit to properly dispose of its components upon decommissioning.

- Follow the standard return procedure, as described in ↳ *Chapter 6.3 “Return policy and procedure” on page 37*.

Safety

3 Overview

The following products belong to the PA Accessories:

Product	Code	Description	See
Switches, buttons, handwheels and manually operated devices	MPG-5V	PA MPG-100, 5V, A/B, 100 I/R, incl. cable 5 m	*Chapter 4.1 "Handheld Device MPG 100" on page 17*
	MPG-24V	PA MPG-100, 24V, A/B, 100 I/R, incl. cable 5 m	*Chapter 4.1.2.4 "Switches and Pushbutton connection" on page 26*
	CAB MPG 2	Cable from CNC to connection plug for PA MPG-100, 2m	*Chapter 4.1.2.4 "Switches and Pushbutton connection" on page 26*
	CAB MPG 5	Cable from CNC to connection plug for PA MPG-100, 5m	*Chapter 4.1.2.4 "Switches and Pushbutton connection" on page 26*
	CAB MPG 10	Cable from CNC to connection plug for PA MPG-100, 10m	*Chapter 4.1.2.4 "Switches and Pushbutton connection" on page 26*
	BUT GRAY	Graycode switch	*Chapter 4.1.2.4 "Switches and Pushbutton connection" on page 26*
	BUT START-STOP	Start/Stop push button	*Chapter 4.1.2.4 "Switches and Pushbutton connection" on page 26*
	BUT JOG	Jog+/- pushbutton	*Chapter 4.1.2.4 "Switches and Pushbutton connection" on page 26*
	HDW-24V	Handwheel, 24V, A/B, 100 I/R	*Chapter 4.2 "Standalone Handwheels" on page 27*
	HDW-5V	Handwheel, 5V TTL (RS422), A/B, 100 I/R	*Chapter 4.2 "Standalone Handwheels" on page 27*

Overview

4 Handheld Operator Devices

4.1 Handheld Device MPG 100

PA MPG 100™

The PA MPG 100™ is a simple, dust and waterproof, manual control unit including:

- a 100-increment handwheel
- a six position axis select switch
- a three-position feed multiplier switch
- two white pushbuttons (that illuminate)
- the Emergency stop pushbutton (push in to lock, twist out to release)

The white pushbuttons are not labeled and can be used e.g. for axis jogging or other machine functions.

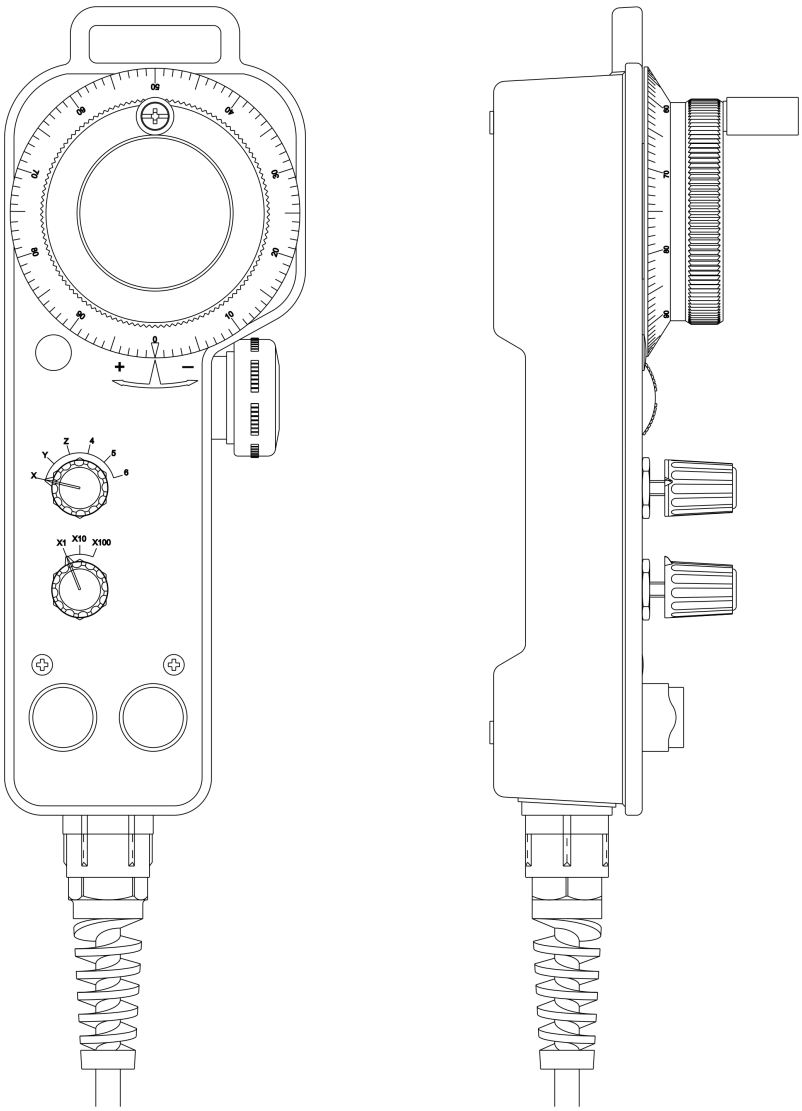

Fig. 1: PA MPG 100

It comes with a 5m (1.64 feet) flexible cord, terminated with a 26 pin industrial round connector. A mating connector and a storing hook are also included.

This manual control unit is available in two versions:

– *with a **24V-level MPG: code MPG-24V***
– *with a **5V-level MPG: code MPG-5V***

4.1.1 Technical Data

4.1.1.1 General Specifications

General Information

Property	Value	Unit
Dimensions	215 x 80 x 82	mm
	8.46 x 3.15 x 3.23	inch
Weight	1.2	kg
	2.65	lb
Cable length (at max. extension)	5	m
	1.64	feet

4.1.1.2 Operating conditions

General

Property	Value	Unit
Operating temperature	-40 - +90	°C
	-40 - +194	°F
Protection class (EN 60529)	IP65	

4.1.1.3 Features

Electrical

Qty	Name	Value	Unit
1	Handwheel	100	pulses/rev.
		2 tracks A / B	
	Operating voltage	5V DC or 24V DC	depending on model
1	Axis selection switch	6	positions
		binary coded	
1	Speed selection switch	2	positions
		binary coded	
2	Illuminated pushbuttons	1 NO	contact
		1 lamp	
1	E-Stop push-button	1 NC	contact
		push/pull lock	

4.1.1.4 Dimension sheet

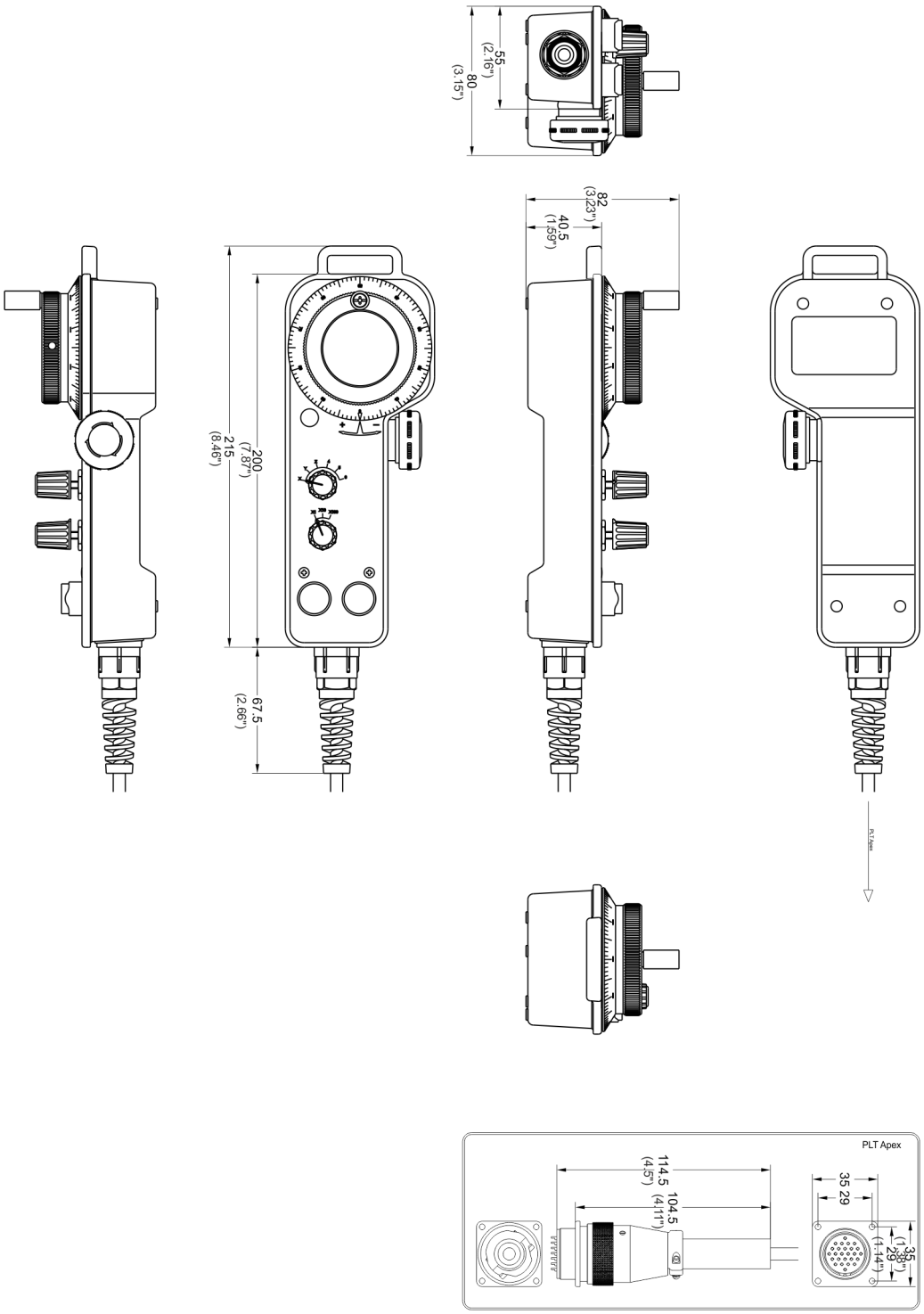

Fig. 2: Dimension sheet

4.1.2 Connection to the control unit

4.1.2.1 MPG 26-pin Connector

Connection

For model MPG-24V: **+Venc = +24V DC**

For model MPG-5V: **+Venc = +5V DC**

Signals A/ and B/ only by model MPG-5V

Axis selection switch bit code:

Switch position	AxBCD (2)	AxBCD (1)	AxBCD (0)	Selected axis
1	0	0	0	X
2	0	0	1	Y
3	0	1	0	Z
4	0	1	1	4
5	1	0	0	5
6	1	0	1	6

Speed selection switch bit code

Switch posi-tion	Rate (1)	Rate (0)	Speed / Incr. factor
1	0	0	x 1
2	0	1	x 10
3	1	0	x 10

Pinning

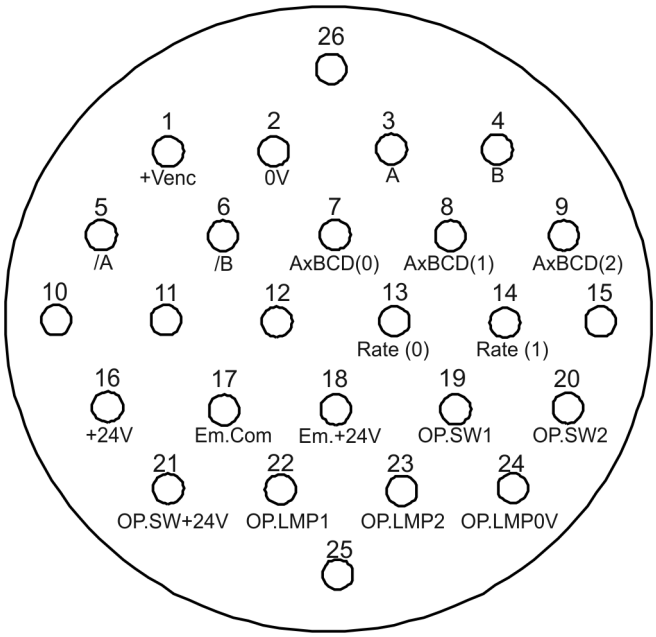

Fig. 3: MPG 100 - 26-pin connector

MPG 26-pin Connector

Pin	Function	Color	Name	Note
1	Hand-wheel power supply	White	+Venc	1
2	Hand-wheel power supply	Brown	0Venc	1
3	Hand-wheel track A	Green	A	
4	Hand-wheel track B	Yellow	B	
5	Hand-wheel track A/	Grey	A/	2
6	Hand-wheel track B/	Pink	B/	2
7	Axis selec-tion switch	Blue	AxBCD (0)	3
8	Axis selec-tion switch	Red	AxBCD (1)	3

Pin	Function	Color	Name	Note
9	Axis selec-tion switch	Black	AxBCD (2)	3
10		Violet	not used	
11		Grey/Pink	not used	
12		Red/Blue	not used	
13	Speed selection switch	White/ Green	Rate (0)	4
14	Speed selection switch	Brown/ Green	Rate (1)	4
15		White/ Yellow	not used	
16	Switches power supply	Yellow/ Brown	+24V DC	
17	E-Stop pushbutton	White/Grey	E-Stop	
18	E-Stop pushbutton	Grey/ Brown	E-Stop	
19	White pushbutton #1	White/Pink	OP.SW1	
20	White pushbutton #2	Pink/Brown	OP.SW2	
21	White pushbutton supply	White/Blue	OP.SW +24V	
22	Lamp of pushbutton #1	Brown/Blue	OP.LMP1	
23	Lamp of pushbutton #2	White/Red	OP.LMP2	
24	Pushbutton lamps grounding	Brown/Red	OP.LMP0V	
25		White/ Black	not used	
26		not wired		

4.1.2.2 MPG-5V connection

Connection

The four handwheel tracks (A, B, A/, B/) of the MPG-5V have to be connected to an encoder input of the control unit.

Any encoder input not used for axes or spindles may be used for this handwheel connection.

Encoder inputs are located either on the control unit directly (see the installation manual of your Power Automation control unit) or on external PAMIO modules of type 4ENC4A or 2ENC4A.

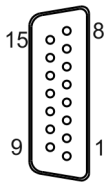

Fig. 4: Encoder Input Connector

The pinning of the encoder inputs is always the following:

Pins	RMS Input Function
Pin 1	Track A+
Pin 2	Track A-
Pin 3	Track B+
Pin 4	Track B-
Pin 5	must be connected to RMS grounding
Pin 6	must be connected to +5 V RMS
Pin 7	not used
Pin 8	not used
Pin 9/11/13/15	RMS grounding
Pin 10/12/14	+5 V RMS

The 5V power supply is available on the given pins as long as a 5V DC power supply is connected on the corresponding input of the control unit (X35) and/or of the PAMIO module (X35).

As the MPG-5V uses an incremental encoder input of an axis, the pins 5 and 6 must be resp. connected to the RMS grounding and the +5V RMS, to avoid measurement system errors from the supervisor of the control unit.

By use of an MPG-5V, the following machine parameters of the "Handwheel" group have to be set to:

- HandwheelNoxInputType = 4
- HandwheelNoxInputChannel = Number of the axis channel used for the connection.

4.1.2.3 MPG-24V connection

Connection

The two hand-wheel tracks (A, B) of the MPG-24V can be connected to any digital input of the control unit.

However, a special functionality is provided on the digital inputs modules 2416EL (digital I/Os integrated in the control unit IPC). On each byte #3 of these modules (one or two modules depending on control unit model), the bits #7 and #8 are supported by the hardware by means of an internal pulse counter, allowing the software just to read the counter value. This functionality is useful when fast movements of the hand-wheel are required (on other standard digital inputs, some counts may be lost due to the sampling time of the I/O reading).

Recommended hand-wheel wiring on 2416EL modules:

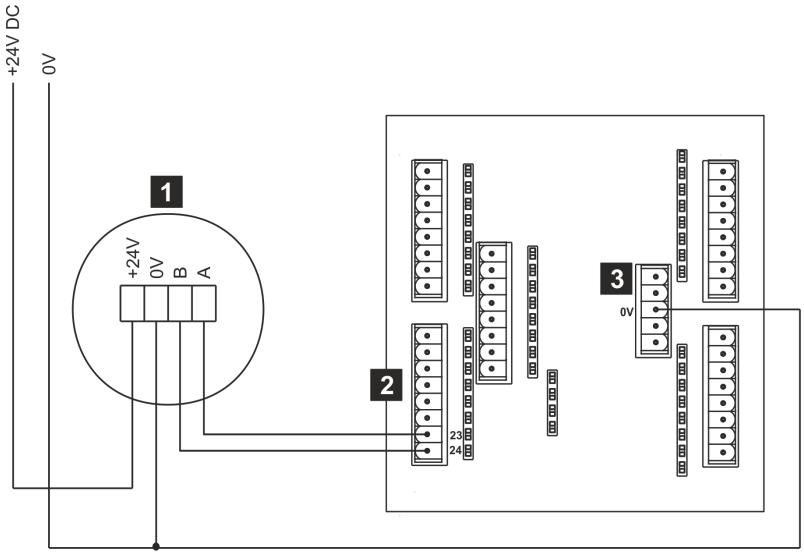

Abb. 5: 24V Handwheel connection

1 Handwheel
2 Input byte #3 (X47)
3 2416EL power supply connector (X30)

By use of an MPG-24V, connected to these specially dedicated inputs, the following machine parameters of the "Handwheel" group have to be set to:

- HandwheelNo1InputType = 6
- HandwheelNo1InputChannel = Number of the input byte used for the connection (usually 3 or 6)

4.1.2.4 Switches and Pushbutton connection

Functionality

The functionality of the selection switches and of the pushbuttons (including pushbutton lamps) has to be managed by the PLC program.

All switches and pushbuttons of the MPG have to be connected to digital inputs and outputs of the control unit. Any inputs / outputs can be used, as long as they match the definition of the PLC program in use.

As an option, Power automation can deliver a prewired cable with the mating connector of the handheld device. This cable is available in different lengths:

- *2m: code:* ***CABLE MPG-2***
- *5m: code:* ***CABLE MPG-5***
- *10m: code:* ***CABLE MPG-10***

The following explanations and wiring recommendation refer to the standard POU for the MPG as available by Power Automation.

Function	Handheld MPG connector	Color PA cable	Input Bit	Note
Track A	Pin 3	Green	7	MPG-24 only !
Track B	Pin	Yellow	8	MPG-24 only !
Axis selection switch	Pin 7 Pin 8 Pin 9	Blue Red Black	1 2 3	
Speed selection switch	Pin 13 Pin 14	White/ Green Brown/ Green	4 5	
E-Stop	Pin 18 Pin 19	Grey/ Brown White/Grey	NO	Hard wiring in E-Stop chain
PB 1	Pin 19	White/Pink	Free	
PB 2	Pin 20	Pink/Brown	Free	

The PLC module available by Power Automation does not define any function nor any input/output pin for the two pushbuttons. The machine integrator has to define the function to be fulfilled by these buttons (e.g. Start/ Stop, or Jog+/Jog-, or both depending on the operating mode) and to write his own PLC code according to this definition.

As an option the following switches / push buttons are available at Power Automation:

- *Graycode switch: code:* ***BUT GRAY***
- *Start/Stop push button: code:* ***BUT START-STOP***
- *Jog+/- push button: code:* ***BUT JOG***

4.2 Standalone Handwheels

Models

Standalone handwheels are available in two models:

- in 24V-level MPG: code **HDW-24V**
- in 5V-level MPG: code **HDW-5V**

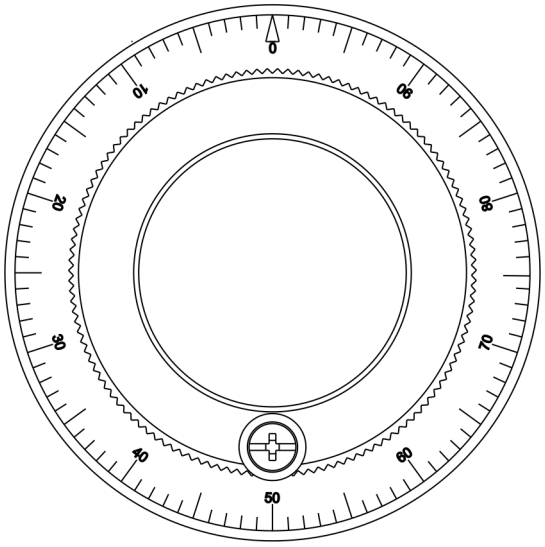

Fig. 6: Standalone Handwheel

4.2.1 Technical Data

4.2.1.1 General Specifications

General Information

Property	Value	Unit
Dimensions	215 x 80 x 82	mm
	8.46 x 3.15 x 3.23	inch
Weight	1.2	kg
	2.65	lb
Cable length (at max. extension)	5	m
	1.64	feet

4.2.1.2 Connection values

HDW-5V

HDW-5V	Value	Unit
Input voltage	5	V DC
Tolerance	+10 / -10	%
Pulse number	100	PPR
Output voltage	5	V DC
Output current	100	mA
Signal mode	A, B, A/, B/	
Output mode	Differential	
Response frequency	10	kHz
Power consumption	120	mA
Start torque	300	g

HDW-24V

HDW-24V	Value	Unit
Input voltage	24	V DC
Tolerance	+10 / -10	%
Pulse number	100	PPR
Output voltage	24	V DC
Output current	80	mA
Signal mode	A, B	
Output mode	R	

HDW-24V	Value	Unit
Response frequency	10	kHz
Power consumption	120	mA
Start torque	300	g

4.2.1.3 Operating conditions

General

Property	Value	Unit
Operating temperature	0 - +50	°C
	+32 - +122	°F
Storage temperature	-10 - +70	°C
	14 - +158	°F
Relative humidity (non-condensing)	80	%
Maximum acceleration (non-operating)	2	G
Maximum acceleration (operating)	0.5	G
Protection class (front side)	IP65	

4.2.1.4 Dimension sheet

External View

External View

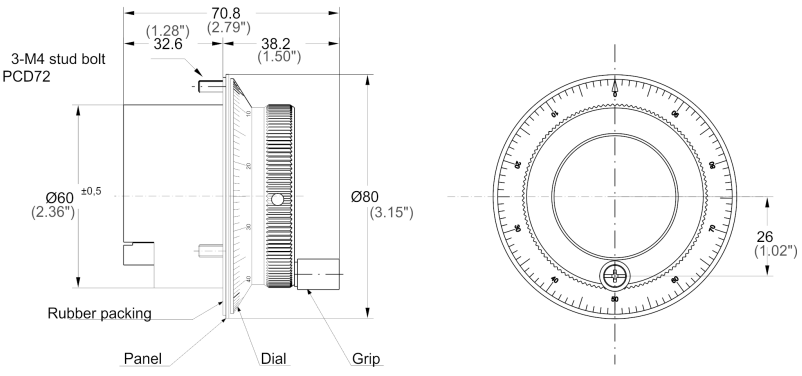

Fig. 7: External View

Panel Cutout

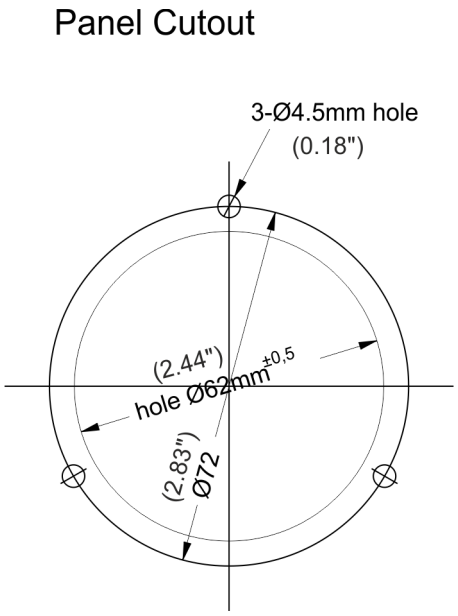

Fig. 8: Panel cutout

4.2.2 Connection to the Control unit

4.2.2.1 HDW-5V connection

Connection To The Control Unit

The four handwheel tracks (A, B, A/, B/) of the HDW-5V have to be connected to an encoder input of the control unit.

Any encoder input not used for axes or spindles may be used for this handwheel connection.

Encoder inputs are located either on the control unit directly (see the installation manual of your Power Automation control unit) or on external PAMIO modules of type 4ENC4A or 2ENC4A.

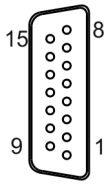

Fig. 9: Encoder Input Connector

The pinning of the encoder inputs is always the following:

Pins	RMS Input Function
Pin 1	Track A+
Pin 2	Track A-
Pin 3	Track B+
Pin 4	Track B-

Pins	RMS Input Function
Pin 5	must be connected to RMS grounding
Pin 6	must be connected to +5 V RMS
Pin 7	not used
Pin 8	not used
Pin 9/11/13/15	RMS grounding
Pin 10/12/14	+5 V RMS

The 5V power supply is available on the given pins as long as a 5V DC power supply is connected to the corresponding input of the control unit (X35) and/or of the PAMIO module (X35).

As the HDW-5V uses an incremental encoder input of an axis, the pins 5 and 6 must be resp. connected to the RMS grounding and the +5V RMS, to avoid measurement system errors from the supervisor of the control unit.

By use of an HDW-5V, the following machine parameters of the "Handwheel" group have to be set to:

- HandwheelNo1InputType = 0
- HandwheelNo1InputChannel = Number of the axis channel used for the connection.

4.2.2.2 HDW-24V connection

Connection

The two hand-wheel tracks (A, B) of the HDW-24V can be connected to any digital input of the control unit.

However, a special functionality is provided on the digital inputs modules 2416EL (digital I/Os integrated in the control unit IPC). On each byte #3 of these modules (one or two modules depending on control unit model), the bits #7 and #8 are supported by the hardware by mean of an internal pulse counter, allowing the software to read the counter value. On other digital inputs, some counts may be lost due to the sampling time of the I/O reading. This functionality is useful when fast movements of the handwheel are required.

Recommended hand-wheel wiring on 2416EL modules:

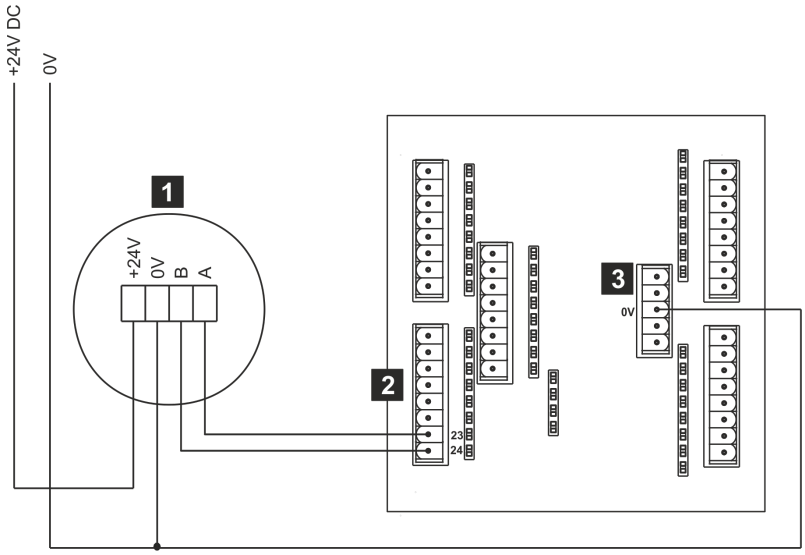

Abb. 10: 24V Handwheel connection

1 Handwheel
2 Input byte #3 (X47)
3 2416EL power supply connector (X30)

By use of an HDW-24V, connected to these specially dedicated inputs, the following machine parameters of the "Handwheel" group have to be set to:

- HandwheelNo1InputType = 6
- HandwheelNo1InputChannel = Number of the input byte used for the connection (usually 3 or 6)

5 Troubleshooting

General Information

The following chapter describes possible causes of faults during installation and configuration and the steps required to eliminate them.

- In the event of frequent faults, re-check if the configuration was set up as described in this installation manual.
- In the event of faults that cannot be eliminated through the following instructions, please contact Power Automation (see ↳ *Chapter 6 “Service and return process” on page 35*).

5.1 Safety notes

Personnel

- The troubleshooting procedures described in this installation manual can be performed by the operator unless otherwise marked.
- Some work may be performed only by specially trained personnel or only by Power Automation, in which case special notice is given in the description of the individual faults.
- All work on the electrical system must be performed by a qualified electrician.

Authorization

WARNING!

Unauthorized troubleshooting procedures can result in injury!

Improper troubleshooting procedures can result in severe personal injury or material damage.

- Observe the personnel requirements for repairs specified in the troubleshooting chart.

  If in doubt, contact Power Automation for help or support by an authorized service technician.
- Ensure that the power supply has been disconnected.
- Make sure that the assembly location is clean and well organized.
- Components that are loosely stacked or lying around can cause accidents.
- If components have been removed, ensure proper assembly, install all mounting elements and comply with screw tightening torques.

In Case Of Faults

The following general rules apply:

Personnel:
- Qualified personnel

Protective equipment:
- Ground strap
- ESD safety shoes
- ESD safety pad
- ESD clothing
- Protective glasses
- Ear protection
- Antistatic gloves

1. In the event of faults that pose immediate danger to man or machine, activate the emergency shutoff function immediately.
2. Determine the cause of the fault.
3. Disconnect the control unit from power supply.
4. Immediately inform the person in charge of the equipment where the fault is located.
5. Depending on the type of fault, eliminate the fault or have it eliminated by an authorized specialist.

6 Service and return process

6.1 Service

Service At Power Automation

By Phone

PA's well-educated service staff is available to answer your technical questions. Due to the close co-operation with our customers, our engineers can solve problems often immediately by phone.

If on-site support is necessary, our service staff will diagnose the problem and will prepare our field service engineer beforehand. This is to make on-site service as much effective as possible

By Remote Control Software

Every PA CNC is equipped with an Ethernet interface. If you have a network on-site, you only have to integrate the CNC system to your network for world-wide-web access.

Power Automation provides a remote control software which allows our service staff to log into your CNC. This provides all the information available on the machine. They can check all the data like the PLC program, machine parameters, or the NC programs directly on the real system under real conditions. This is the fastest and most cost-effective way to solve problems.

On-Site

If neccessary our service engineers will visit you to help you solve your problems on-site. Our engineers are trained continuously to be always up to date. Thereby you always can expect the best support.

Due to our service centers worldwide, our service staff can be on site normally within 24 hours at the latest.

6.1.1 Service addresses

Service Addresses

Power Automation GmbH (Headquarter)

Gottlieb-Daimler-Strasse 17/2

D-74385 Pleidelsheim

Tel: +49-7144-899-0

Fax: +49-7144-899-299

service@powerautomation.com

Service and return process

Power Automation America, Inc.
8601 Jameel Road, Suite 140
Houston, Texas 77040 USA
Tel: +1-713-263-9400
Fax: +1-281-715-2500
sales.america@powerautomation.com

Power Automation Office Turkey
Kustepe Mah. Mecidiyekoy Yolu Cad.
Trump Towers No. 12 Kule: 2 K:18
Daire no: 3211022839 Sisli / Istanbul
Turkey
Tel: +90-212-306-3280
Fax: +90-212-306-3101
sales.turkey@powerautomation.com

Shenzhen Double CNC Tech Co., Ltd
8th Floor,WeiXinDa Building
Bao Min Road 2
Xi Xiang Town
Bao'an District, Shenzhen, Guangdong
PR China

Power Automation France SARL
Cité de la Photonique
Bâtiment Pléione
11 avenue Canteranne
33600 Pessac
France
Tel: +33-559-4010-50
Fax: +33-559-4010-59
pa.france@powerautomation.com

ACE Automation

A-721, Twinrex B/D

Deokpungdong-ro 111-10, Hanam-si

Gyeonggi-do, 465-831

South Korea

6.2 Spare parts

Spare Parts

Due to the high quality of our products we can assure you that you will not need this service often. Spare parts are often urgent so Power Automation provides the relevant spare parts at the local service centers for immediate dispatch.

Our 3 service centers in Europe, North America and Asia allow us to deliver all needed parts typically within 24 hours.

Only trust PA's original parts - because every part passes our tight quality checks.

We also offer consulting services to identify the most critical parts for the machines in your production facilities. We suggest what critical stock may be required to ensure a minimum downtime of your machines. Our specialists look for common parts to keep your inventory levels at a minimum.

6.3 Return policy and procedure

Policy

Power Automation will only accept control units and components for replacement or repair, if they have been returned in adherence to the provisions given below.

- If material warranty is void or if no error is detected, a testing flat rate will be charged. For present values please contact the Power automation Service *Chapter 6.1.1 “Service addresses” on page 35*
- If material warranty is void you will receive a repair offer.
- Before the repair starts we need a repair order from you.
- Power Automation will impose a rate for the estimate of costs which will be absorbed if a repair order is coming about.

Service and return process

Acquiring RMA Number

1. Contact Power Automation to receive an RMA form in Excel format. *“RMA Form” on page 39*
2. Open the 'RMA Process' form provided by Power Automation.

   Use one form for each single part you want to ship back to Power Automation.
3. Fill in the form.

   The fields marked with a red star (*) are mandatory fields.

   Only fill in the fields next to the yellow bar on the left side of the form.

   Do not fill in the fields next to the blue bar on the left side of the form. These fields are for internal notes only and blocked.
4. Send the completed form as Excel file by email to **rma@powerautomation.com** to your local support (see webpage).

   ⇨ We will check the data and send the form back to you as a PDF file including a RMA number or tell you what information is missing if necessary.
5. Print the RMA form and add it to the accompanying components and documents.
6. After the check and repair the components will be shipped to you immediately.

RMA Form

RMA Formular - Vom Kunden auszufüllen / **RMA Form** - To be filled out be customer

Kontakt bei PA / Contact at PA: *

Datum / Date: 05.06.2014

Kunde / Customer:

(Unternehmen / Company) *

(Kundennummer / Customer No.) *

(Adresse / Adress) *

(Name / Name) *

(Telefon / Phone) *

(Fax / Fax)

(eMail / eMail)

POWER AUTOMATION

Return of Material Authorization

Power Automation GmbH
Gottlieb-Daimler-Strasse 17/2
74385 Pleidelsheim
Germany
Phone: + 49 (0) 7144/899 - 321
Fax: + 49 (0) 7144/899 - 299
E-Mail: rma@powerautomation.com

Artikelbezeichnung / Part Description : *

☐ PA 8000 e ☐ PA 8000 L2 ☐ PA 8000 NT ☐ Zubehör / Accessories ☐ Antrieb / Drive ☐ P1, P2, other
☐ PA 8000 e2 ☐ PA 8000 LW ☐ PA 8000 EL ☐ Bedienfeld / Panel ☐ Motor

Seriennummer / Serial No.: *

Lieferschein-Nr. / Delivery Note No.: *

☐ Express

Sofortige Bearbeitung garantiert! Es entstehen zusätzliche Kosten!!

Grund der Warenrücksendung / Reason for return of the goods:

☐ Musterrücksendung / Sample Return ☐ Reparatur / Repair ☐ Andere / Other
☐ Gutschrift / Credit ☐ Umbau / Conversion

Detaillierte Fehlerbeschreibung / Detailed Error Description, Notizen / Notes, ...: *

*** = Pflichtfeld / Mandatory Field**

To be filled out by Power Automation

Interne Vermerke / Internal Notes:

☐ **RMA Nummer erteilen / Accept RMA number**

☐ RMA Nummer nicht erteilen / Reject RMA number

Zuständig bei PA / Responsible at PA:

RMA Nummer / RMA number:

Vermerke / Notes

(Unterschrift / Signature)

(Stempel / Chop)

Wichtige Hinweise / Important indications:

Außerhalb der Gewährleistung wird eine Testpauschale von 100€ berechnet / Out of warranty period a testing flat rate of 100€ will be charged
Bitte verpacken Sie die Ware angemessen / Please pack the goods in an adequate way
Steuerungen können nur in Originalverpackung oder gleichwertiger Verpackung angenommen werden / Contrds can only be accepted in original enclosures or equivalent
Power Automation haftet nicht für Transportschäden/ Power Automation does not bear any liability for damages in transit
Lieferungen werden nur FREI angenommen / Deliveries are only accepted FREE DOMICIL
Lieferungen ohne RMA Nummer werden nicht angenommen/ Deliveries without RMA Number will be rejected
Die RMA Nummer muss am Karton außen gut sichtbar sein / The RMA number must be visible well from outside the cardbox
Das RMA Formular muss den Begleitdokumenten beigefügt sein / The RMA form must be added to the accompanying documents

Fig. 11: RMA Form

Return

1. Pack the goods properly.

   Controls must be packed in original or equivalent packaging.

> **NOTICE!**
>
> **Damages due to inadequate packaging**
>
> Inadequate packaging may result in damages to the control unit. This will void the material warranty. PA does not bear any liabilities for damages in transit.

2. Write the RMA number on the cardboard box clearly readable from outside.

   The incoming goods department rejects all deliveries without a visible, valid RMA number.

3. Ship the goods FREE DOMICILE / DDU. Other deliveries will be rejected.

   The goods have to arrive within 4 weeks after the date of the approved RMA form.

6.4 Training

Training Courses

Having the best CNCs is one thing, to bring out the best of it is the other.

The PA training program comprises of a number of individually combinable training modules which offer you a well-founded knowledge for using PA CNCs. At our training centers we bring your employees - beginners and experts- up to the scratch in CNC technology. We also offer individual training courses at your site. The contents of the courses will be customized to your requirements.

Fpr more information see *Chapter 6.1.1 “Service addresses” on page 35*.

7 Proof of Change

Proof Of Change

Version	Change	Date
1	Original Version	12/15/2014
2	Changes in Chapter 4.1.2.4	01/20/2015

Proof of Change

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